

Preliminary Course Information

Psychology G4220

Cognition and Psychopathology

Fall 2009

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I. Bulletin description

PSYC G4220x. Cognition and Psychopathology (seminar)

4 points. E. E. Smith. Mondays: 6:10-8 p.m. Room 405 Schermerhorn Hall

Prerequisite: At least two other psychology courses and the instructor's permission.

Discussion of issues and research on the breakdown of basic neurocognitive processes in psychopathology. The focus will be on working memory and cognitive control-- the cognitive processes most vulnerable in many psychiatric disorders, including: Schizophrenia, Major Depressive Reaction, Obsessive Compulsive Disorder (OCD), Generalized Anxiety Disorder, and Substance Abuse. Discussions will focus on issues such as: What can we learn about the neural circuitry involved in a particular psychiatric disorder from studying deficits in cognitive tasks? What can we learn about normal cognition from studying cognitive deficits in psychopathology?

II. A full description of the content of the course

This seminar examines a number of issues about cognitive deficits in major mental disorders, focusing particularly on deficits in working memory and cognitive control (e.g., inhibitory processes). In discussing each issue, we will consider research that focuses on both mental and neural processes, in both normals and some patient population of interest. The issues include: (1) In Schizophrenia, what is the relation between patients' deficits in working memory and their disturbance in the dopamine systems?; (2) In Schizophrenia, can we use knowledge of impaired neural circuitry to predict specific cognitive deficits?; (3) In Depression, can a deficit in the ability to inhibit the contents of working memory be partially responsible for the excessive rumination that occurs in this disorder?; (4) In OCD, can a deficit in the ability to inhibit responses be involved in compulsions to carry out undesirable actions?; (5) In both Depression and Schizophrenia, what is the neural basis of the anhedonia that is so central to these disorders?

Specific issues covered may vary in future terms. Seminar may be repeated for credit in some instances.

III. The rationale for giving the course

PSYC G4220 is an advanced seminar, designed particularly for undergraduates who are majoring in Psychology or in Neuroscience and Behavior, for students participating in the Post-bac Psychology Program, for Psychology Graduate Students, and for Psychiatric Residents and Fellows. In covering the cognitive and neural bases of memory and cognitive control, the course provides an integrated perspective on topics of current interest in the fields of psychology and neuroscience. The course is intended to explore the ideas of interest in the broader context of liberal arts education, such as the nature of human knowledge and abilities.

It fulfills the following degree requirements:

- For Psychology Graduate Students PSYC G4220 will apply toward the “two seriously graded seminars” requirement for the Master’s degree.
- For the Psychology major of concentration in the College and in G. S., for the Psychology minor in Engineering, and for the Psychology Post-bac, PSYC G4220 will meet the Group I (Perception and Cognition) distribution requirement.
- For the Neuroscience and Behavior joint major, G4220 will fulfill the 5th Psychology requirement: “one advanced psychology seminar from a list approved by the Psychology Department advisor to the program.”
- For the Psychology Postbac certificate, PSYC G4220 will fulfill the advanced seminar requirement.
- For the science requirements of the College and GS, G4220 meets the second term of the requirement, provided that students obtain the necessary permission and have taken the prerequisite two psychology courses. For instance, a student who has completed PSYC 1010 (Mind, Brain, and Behavior) and PSYC 2680 (Social and Personality Development), would be able to use G4220 for the second term of the integrated sequence requirement. However, students who are majoring in Psychology or in Neuroscience and Behavior will have priority over students who are taking the course for the science requirement.
- For the Barnard Psychology major, PSYC 4220 will fulfill the senior seminar requirement.

IV. The reading list and weekly syllabus

Discussion topics and representative reading assignments for the first nine (of 13) weeks are provided below.

Week 1

09/14/09

Topic: Introduction and orientation to the seminar

Week 2

09/21/09

Topic: Normal Working Memory (WM) and Cognitive Control

Readings: Smith, E.E., and Jonides, J. (1999). Storage and executive processes in the frontal lobes. *Science*, 283, 1657-1661.

Smith, E. E. (2007). Executive processes. In E.E. Smith & S.M. Kosslyn (Eds.), *Cognitive psychology: Mind and brain*. Pp. 280-322. New Jersey: Prentice Hall.

Week 3

09/28/09

Topic: Deficits in WM in Schizophrenia, and their Neural Bases

Readings: Barch, D. M. (2005). The cognitive neuroscience of schizophrenia. In T. Cannon and S. Mineka (Eds.) *Annual Review of Clinical Psychology* (pp. 321 – 353). Washington, DC: American Psychological Association.

Manoach, D.S. (2003). Prefrontal cortex dysfunction during working memory performance in schizophrenia: reconciling discrepant findings. *Schizophrenia Research*, 60, 285-298.

Week 4

10/05/09

Topic: Deficits in WM in Schizophrenia and their Relation to Dysregulation of the Dopamine System

Readings: Abi-Dargham, A., O. Mawlawi, I. Lombardo, R. Gil, D. Martinez, Y. Huang, D. R. Hwang, J. Keilp, L. Kochan, R. Van Heertum, J. M. Gorman and M. Laruelle (2002). Prefrontal dopamine D1 receptors and working memory in schizophrenia. *Journal of Neuroscience*, 22, 3708-3719.

Braver, T. S., D. M. Barch and J. D. Cohen (1999). "Cognition and control in schizophrenia: a computational model of dopamine and prefrontal function." *Biological Psychiatry*, 46, 312-328.

Topic: Deficits in WM in Depression and their Neural Bases

Readings: Austin, M. P., Wilhelm, K., Parker, G., Hickie, I., Brodaty, H., Chan, J., et al. (1999). Cognitive function in depression: A distinct pattern of frontal impairment in melancholia? *Psychological Medicine*, 29, 73-85.

Barch, D. M., Sheline, Y. I., Csernansky, J. G., & Snyder, A. Z. (2003). Working memory and prefrontal cortex dysfunction: Specificity to schizophrenia compared with major depression. *Biological Psychiatry*, 53, 376 – 384.

Matsuo, K., Glahn, D. C., Peluso, M. A., Hatch, J. P., Monkul, E. S., Najt, P., et al. (2007). Prefrontal hyperactivation during working memory task in untreated individuals with major depressive disorder. *Molecular Psychiatry*, 12, 158 – 166.

Topic: Deficits in Cognitive Control in Schizophrenia, and their Neural Bases

Readings: MacDonald, A. et al. (2005). Specificity of prefrontal dysfunction and context processing deficits to schizophrenia in never-medicated patients with first-episode psychosis. *American Journal of Psychiatry*, 162, 475 – 484.

Barch, D., Carter, C., Hachten, P. C., Usher, M., & Cohen, J. D. (1999). The "benefits" of distractibility: Mechanisms underlying increased Stroop effects in schizophrenia. *Schizophrenia Bulletin*, 25, 749 – 762.

Topic: Breakdowns in Inhibition in Patients with OCD

Readings: Simpson, B., Rosen, W., Huppert, J. D., Lin, S., Foa, E., & Liebowitz, M. R. (2005). Are there reliable neuropsychological deficits in obsessive-compulsive disorder? *Journal of Psychiatric Research*, 40, 247 – 257.

Chamberlain, S. R., Blackwell, A. D., Fineberg, N. A., Robbins, T. W., & Sahakian, B. J. (2005). The neuropsychology of obsessive compulsive disorder: The importance of failures in cognitive and behavioural inhibition as candidate endophenotypic markers. *Neuroscience and Biobehavioral Reviews*, 29, 399 – 419.

Chamberlain, S. R., Menzies, L., Hampshire, A., Suckling, J., Fineberg, N. A., del Campo, N, et al. (2008). Orbitofrontal dysfunction in patients with obsessive-compulsive disorder and their unaffected relatives. *Science*, 321, 421 – 422.

Week 8

11/09/09

Topic: Anhedonia and Social Withdrawal in Schizophrenia and Depression

Readings: Gold, J. M., Waltz, J. A., Prentice, K. J., Morris, S. E., & Heerey, E. A. (2008). Reward processing in schizophrenia: A deficit in the representation of value. *Schizophrenia Bulletin*, 34, 835–847.

Juckel, G., Sass, L., & Heinz, A. (2003). Anhedonia, self-experience in Schizophrenia, and implications for treatment. *Pharmacopsychiatry*, 36, S176-S180.

Week 9

11/16/09

Topic: Effects of Anhedonia on Learning

Readings: Murray, G. K., et al. (2008). Reinforcement and reversal learning in first-episode psychosis. *Schizophrenia Bulletin*, 34, 848 – 855.

Juckel, G., Schlagenhauf, F., Koslowski, M., Wustenberg, T., Villringer, A., Knutson, B., et al. (2006). Dysfunction of ventral striatal reward prediction in schizophrenia. *Neuroimage*, 29, 409 – 416.

V. Course requirements

Each week, students will attend a two-hour seminar. Class time will be devoted to the presentation and discussion of book chapters and journal articles. The readings are intended to provide background knowledge on relevant original research, and to serve as a stimulus for discussion. Each student will sign up to lead a discussion and present assigned readings; graduate students will be expected to lead the discussion twice.

During the second half of the semester, the students write a term paper due on the Monday of Reading Week. This 15 page paper should take the form of a critical review paper that addresses a specific question related to the topics of the seminar.

Grading is allocated as follows:

Discussion Leading/Presentation	30%
Term paper	40%

Attendance and participation	30%
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